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Preserving Fence Posts on Farms

Many farmers want to know if on farm preservation of round fence posts is practical. The answer is yes.

Small diameter trees can be used as fence posts if the sapwood around the impermeable heartwood is impregnated with a preservative. Provided that the sapwood band has a minimum thickness according to Table 1, most hardwoods eg: jarrah, marri, WA blackbutt, Tasmanian blue gum and radiata pine can be treated. Treated posts can last for 30 years or more.
A CSIRO trial at Wickepin started in 1930 has creosote treated marri post still servicable after 60 years.

Table 1

Minimum thickness of sapwood at any point after seasoning.

Durability of rating timber species	Minimum thickness of sapwood (mm)
1 and 2	12
3	16
4	20

Natural Durability

Natural durability of timber is based on the expected performance of outer heartwood when used in ground contact. The performance of untreated heartwood above ground will generally be better than its performance in the ground, and thus the durability ratings reflect the more severe conditions of in-ground contact.

Four classes have been devised by the CSIRO Division of Forest Products and in some cases a plus or minus rating within a class has been assigned. It is recognised that there is a large variation of in-ground durability within most timber species, and that this variation can be apparent both between different trees and within the same tree.

Thus the ratings listed below are intended as a guide for the user and are not necessarily categorical assignments. In addition, currently available data suggests that termite resistance of a timber species can be markedly different to that species decay resistance.

For all timber, the untreated sapwood should be regarded as non-durable in any use where a decay or insect hazard exist. Also the inner heartwood - the first few growth rings around the pith - generally has lower decay and insect resistance than the rest of the heartwood. The following classifications have been assigned with the foregoing remarks in mind. As further reliable evidence become available the ratings may need to be changed.

Class 1 (Highly durable). Timbers of the highest natural durability which may be expected to have a life of about 25 years or more. eg: Wandoo (1+).

Class 2 (durable). Timbers of high natural durability which may be expected to have a life of 15 years to 25 years. eg: jarrah (2+), raspberry jam, white cypress pine (2+).

Class 3 (moderately durable). Timbers of moderate durability which last between 8 and 15 years. eg: marri (3+), karri and brown mallet.

Class 4 (not durable). Timbers of low durability which may be expected to last less than 8 years. These timbers have about the durability as untreated sapwood. eg. Pinus radiata and P. pinaster

Post preparation and debarking

Generally round fence posts are 1.8 m long, however different sizes are required for different applications eg. emu farm fencing and grape vine trellis. An allowance must be made for docking any excessive end splits following drying and to remove dirt and other foreign matter which might inhibit preservative uptake. In the case of pine some of the cells may be blocked by resin exuding from the ends. Remove all branches and stubs. Selection of small posts eg. 8 to 10cm diameter under bark requires less preservative per post and more can be treated per batch.

Debarking

All bark and cambium must be removed, as even small patches of bark prevent uniform entry of the preservative. Care must be taken not to damage any sapwood. Debarking can be done by hand with an axe or by a mechanical debarker. Both methods are time consuming and costly.
Chainsaws can now be fitted with special debarking heads which are easy to operate. Mr Barry Whale of Cuballing has a planer mounted on a chainsaw and a bench for turning posts. His debarking costs are $35/m3 or $0.70 - $0.80 per post. Stihl chainsaws are currently testing a chainsaw debarker.

The best time of year to debark is when local experience shows that the bark is most easily removed. Posts should be debarked immediately after felling as the bark may become tight, and this also prevents fungal and insect attack. Pine posts are more easily barked with a sharpened spade than with an axe, one end of the post being raised off the ground and the bark chipped off by pushing the sharp edge of the tool down along the length of the post.

Drying

Dry posts will absorb more creosote than green, particularly in the hot and cold bath method. It is necessary to dry to below fibre saturation point (30 percent moisture content) before treatment, which takes between 5 and 7 weeks during the summer. Posts need to be stacked to achieve a good air-flow and sheltered from rain. This can be achieved by stacking posts in alternating rows or with strippers used to space the posts. It is advisable to build the stack in an exposed position, open to the prevailing winds and free from fire danger. Position the bottom posts well off the ground and keep the ground around the stack clear of rubbish and weeds. If in hot dry weather the posts split badly, stack them more compactly.

Machining

It is desirable that all machining processes including boring, planing, docking etc. be carried out prior to treatment. Docking after treatment will expose untreated ends to insect and fungal attack. Where boring is done after treatment, it is advisable to re-treat any timber exposed by machining by liberal brush application of creosote.

Chemicals

High temperature creosote should be used instead of Cleansote (emulsified creosote) as heating Cleansote causes sludging. High temperature creosote is available from Countrywide Pest Control in Rockingham (09 5279193) or you can deal direct with Koppers in Newcastle. Water borne chemicals eg. copper chrome arsenic (CCA) are no longer available to farmers.

Treatment Methods

The treatment methods for preserving round fence posts on the farm are described in the attached memo.

Creosote will readily penetrate the sapwood and only partially into heartwood under high pressures. The amount of sapwood needs to be estimated as this will determined the volume of creosote used. CSIRO recommend a sapwood retention of 160 kg/m3 (146 l/m3) for the butt and between 48 to 64 kg/m3 (44 to 58 l/m3) for the crown. A relationship between the uptake of creosote and the drop in the level within the treatment drum can be determined for different species, grown under different conditions. Fence posts used in-ground contact need to be treated at the butts to about 100 mm above the ground line position eg. 760mm in a 1.8m post. A lighter crown treatment is required, which reduces weathering and insect attack.

Equipment for the Hot and Cold bath method

For treatment on a small scale the following is required:

- A 205 l drum for butt (760 mm) treatment and a 205 l drum extended to about 1.2 m to treat the crown (1040 mm).
- Draining troughs made by cutting a drum in half lengthwise.
- A leaning rail for the posts standing in the draining troughs.

(Additional drums can increase production.)

-A base hot plate. or immersion heater A cast aluminium thermostatically controlled base plate can used. (available from Sephco Australia for approx. $750).

-Insulation to wrap around the treatment vessel eg. R2.0 batts. This will depend on the capacity of the heater.

In all hot and cold bath treatments care is necessary to prevent the preservative from catching alight. An open fire may be placed directly under the heating drum, but it is safer to build an earth-covered fire chamber with flue or use and electric hot plate. Where steam is available, heating with a steam coil is satisfactory.

-Steel mesh or a metal grid cut to fit the base of the drum. This elevates the posts off the bottom of the drum.

-Weights to prevent floatation.

-A temporary roof should also be provided over the treating drums, as water in oil preservatives is likely to cause sludging and to interfere with penetration.

Hot and Cold bath

This method is most effective on dry posts. It consist essentially of heating dry posts in high temperature creosote, and then allowing them to cool in it or transferring them quickly to a drum of cold preservative to cool. This leaves the heating drum available for the next batch.

Normal practice is to apply the hot and cold bath process only to the butt 760mm of the posts. For the light treatment of the tops, cold soaking is usual. This can be done either before or after the butt treatment, but treating the tops first gives cleaner handling.

A typical schedule would be:

1. Place posts butt-down in the treating drum and add high temperature creosote to a depth of 760mm. Ensure the level is 75 to 100 mm below the top of the drum as, heat expands the creosote and this can cause spillage.
2. Heat preservative to a temperature between 82 and 104 degrees C for 2 to 4 hours.
3. Allow the posts to cool in the preservative overnight. If too much preservative is absorbed, the posts can be removed after a shorter cooling period, while the preservative is still warm.
4. Remove a test post, cross cut it and observe the creosote distribution.
5. Drain and collect excess preservative.
6. Soak top 1040 mm of each post for at least two to three days in cold or luke warm creosote.

Precautions should be taken to keep water out of the preservative, as it not only affects penetration but is liable to boil over when heated. After each batch the creosote needs to be stirred as some sludge will form on the bottom of the drum, preventing uptake. After several batches, bark and sludge may deposit at the base of the drum. This will need to be removed from the drum.

It is necessary to purchase somewhat more preservative than is required to preserve the posts as the treatment drums must be full in order to soak the full length.

Cold soaking

This treatment consists simply of soaking the dry posts in a bath of unheated preservative, preferably during warm summer weather. A two - stage treatment, giving the butt a heavier treatment than the tops is recommended. The same treatment drums and similar procedures as used in the hot and cold bath method are followed. The disadvantage of this method is that it takes up to 15 days to treat the butts, compared to a few hours in the hot and cold bath method.

Costs

A pallet of four drums of creosote ex Sydney (including transport) costs approx. $220 or $1.07 per litre. Treatment costs will depend on the sapwood volume and the required retention. Costs of treating dry marri posts, 10cm small end diameter under bark were about $1.50 per post. Local agents can give more up to date costs. Treatments costs may be reduced by diluting the creosote with up to an equal amount of heavy mineral oil eg. sump oil, but this may cause sludging and give a dirty treatment.

Safety Procedures

A chemical data sheet outlining safety procedure will be given by the company supplying creosote. When using creosote, avoid contact with eyes, skin and clothing. This can be achieved by wearing overalls, full length rubber gloves, a hat and goggles. A barrier cream should be used on exposed parts of the body such as hands, arms and face particular when operating outdoors. After use wash hands, arms and face thoroughly with soap and water.

Provided these safety procedures and treatment is conducted in a well ventilated open shed, creosote is safe to use.

Natural hazards

Fire. A fence post soon after treatment with an oily preservative will catch fire more readily than an untreated post. However, when exposed to the sun and rain the surface of the post does not remain oily for long. Usually the fire risk falls rapidly during the first year and thereafter is generally lower than an untreated post. Although creosote treated posts will ignite fairly easily (particular when recently treated) once the fire has passed

the flames are self-extinguishing with the evolution of dense smoke. CCA treated posts do not readily ignite in grass fires. It is the "afterglow" effect which causes posts or continue to burn.

Hazard to stock. In general, posts treated with any of the recommended wood preservative present no hazard to stock. In most cases a very large quantity of the treated wood would need to be eaten before any signs of sickness would develop, and even stock prone to chew posts are most unlikely to consume enough preservative to cause acute of chronic poisoning.